

REMARKS

This response is intended as a full and complete response to the Office Action dated July 7, 2009, having a shortened statutory period for response set to expire on October 7, 2009. A Petition for Revival is being submitted concurrently herewith. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1, 2, 4-13, 15, 16, 19-33 and 37-42 remain pending in the application and are shown above. Claims 1, 2, 4-13, 15, 16, 19-33 and 37-42 are rejected. Reconsideration of the rejected claims is requested for reasons presented below.

Claims 1, 8, 16, 19, 28, 32, 37, 38, and 42 are amended to clarify the invention. Support for the amended claims may be found, for example in FIGS. 3-7 of the present invention. These amendments are not presented to distinguish a reference, thus, the claims as amended are entitled to a full range of equivalents if not previously amended to distinguish a reference.

New claims 43-45 have been added to further recite patentable aspects of the invention. Support for new claims 43, 44, and 45 may be found, for example, on pages 11 and 12 and FIG. 11 of the present application. It is believed that no new matter has been introduced by these amended and new claims. Applicants respectfully request entry of the amendments and new claims 43-45.

Claim Rejections – 35 USC § 102 & 103

Claims 1, 2, 4-7, 9, 11, 15, 16, 28-33, 38 and 39 are rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 5,645,469 to *Burke et al.* (hereinafter *Burke*). Claims 8, 10, 12, 13, 19-24, 25-27, 37, 40, 41 and 42 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Burke*. Applicant respectfully traverses the rejection.

Amended claim 1 recites, inter alia, wherein the non-intersecting fluid retaining grooves extend from a center portion of the semiconductor polishing device to an edge of the semiconductor polishing device. Claim 15 recites, inter alia, wherein the one or more fluid retaining grooves extend from the center portion of the substrate polishing pad to an edge of the substrate polishing pad. Amended claim 16 recites, inter alia, wherein the grooves extend from a center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device. Amended claims 19 and 28 recite, inter alia, wherein at least one of the non-intersecting fluid retaining grooves extends from a center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device. Amended claim 32 recites, inter alia, wherein the non-intersecting fluid retaining groove extends from a center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device. Amended claim 37 recites, inter alia, wherein at least one of the non-intersecting fluid retaining grooves extends from a center portion of the semiconductor polishing pad to an outer portion of the semiconductor polishing pad. Amended claim 38 recites, inter alia, wherein the fluid retaining grooves extend from a center portion of the semiconductor polishing device to an edge of the semiconductor polishing device.

Burke fails to teach, show, suggest, or otherwise make obvious at least the aforementioned features.

The Examiner states that extending the length of the groove from the center to the edge of the pad would be necessitated by the need to provide slurry to the larger surface area and hence provide the capability of polishing larger surface areas thus minimizing polishing time. The Examiner concludes that it would be a matter of engineering expedient to extend the length of the groove and this could be determined through routine experimentation. See Office Action at page 3.

Burke teach a polishing pad shaped like an annular ring without a center as shown in FIGS. 1-8 of *Burke*. *Burke* teaches a polishing pad without a center of the pad. As a result, *Burke* does not teach "non-intersecting fluid retaining grooves that extend from a

center portion of the semiconductor polishing pad" because the pad of *Burke* does not have a center.

The polishing surface of *Burke* contains an inner radius and an outer radius (R3 in FIGS. 1, 2, 3, and 6 and R5 in FIGS. 3 and 4) with channels configured to direct slurry from the inner radius to the outer radius and to direct the slurry up to the polishing surface at the outer radius. See *Burke* at col. 2: lines 42-49. *Burke* teach that when a wafer is positioned over the outer radius and slurry is dispensed on the pad, a significant amount of slurry is directed between the wafer and the polishing pad instead of building up around the edge of the edge of the wafer or flowing past the wafer. See *Burke* at col. 2: lines 49-55. The goal of *Burke* is to deliver slurry to the portion of the pad where the wafer is polished. Extending the channels of *Burke* to the edge of the pad of *Burke* would cause slurry to flow past the wafer and off of the pad which is contrary to the teachings of *Burke* to direct slurry between the wafer and the pad.

The polishing surface 32 of *Burke* also includes a plurality of circumferential grooves 46 on all regions of polishing surface 32 between circumferential trench 45 and outer circumferential edge 34 outside channels 40. See *Burke* at col. 5: lines 39-43. Applicant submits that the polishing pad of *Burke* already has circumferential grooves 46 for providing slurry to the larger surface area of the pad and as a result, it would not be obvious to one of ordinary skill in the art to extend the channels of *Burke* to the edge of the pad since *Burke* already contains a mechanism for providing slurry to the larger surface area of the pad.

Therefore, *Burke* does not teach, show, suggest, or otherwise make obvious an apparatus, comprising a semiconductor polishing device having a first surface defining at least two non-intersecting fluid retaining grooves at least a portion of which is oriented at an angle relative to a radial line originating at a center of the semiconductor polishing device, wherein the non-intersecting fluid retaining grooves extend from a center portion of the semiconductor polishing device to an edge of the semiconductor polishing device and are adapted to flow a fluid inwardly toward the center portion of the semiconductor

polishing device, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove as recited in amended claim 1 and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Also, *Burke* does not teach, show, suggest, or otherwise make obvious a substrate polishing pad, comprising (a) a polishing surface on a first side of the substrate polishing pad and (b) a mounting surface on a second side of the substrate polishing pad, wherein at least one of the polishing surface and the mounting surface has a plurality of non-intersecting fluid retaining grooves formed therein, wherein the grooves are disposed so that upon a given direction of movement of the substrate polishing pad a fluid disposed in the grooves is urged to flow from an outer portion toward a center portion of the substrate polishing pad, wherein the one or more fluid retaining grooves extend from the center portion of the substrate polishing pad to an edge of the substrate polishing pad, and wherein no point of the grooves is tangent to a radial line extending from a center to the substrate polishing pad, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 15. Withdrawal of the rejection is respectfully requested.

Also, *Burke* does not teach, show, suggest, or otherwise make obvious a substrate polishing pad, comprising: a substrate polishing pad, comprising (a) a polishing surface on a first side of the substrate polishing pad; and (b) a mounting surface on a second side of the substrate polishing pad, wherein at least one of the polishing surface and the mounting surface has a plurality of non-intersecting fluid retaining grooves formed therein, wherein the grooves extend from a center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device and are disposed so that upon a given direction of movement of the substrate polishing pad a fluid disposed in the grooves is urged to flow from the outer portion toward the center portion of the substrate polishing pad, and wherein the grooves are formed on the mounting surface and the substrate

polishing pad comprises perforations extending between the polishing surface and the mounting surface, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in amended claim 16. Withdrawal of the rejection is respectfully requested.

Also, *Burke* does not teach, show, suggest, or otherwise make obvious an apparatus for polishing a substrate, comprising (a) one or more rotatable platens; (b) a motor coupled to the rotatable platens; (c) one or more polishing heads rotatably mounted in facing relation to the rotatable platens; and (d) a polishing pad disposed on each of the rotatable platens, wherein at least one of the rotatable platens and the polishing pads comprise a plurality of non-intersecting fluid retaining grooves formed on a first surface thereof and wherein at least a portion of the grooves are disposed at an angle to a radial line extending from a center of the first surface and are adapted to flow a fluid inwardly from an outer portion to a center portion of the first surface, and wherein at least one of the non-intersecting fluid retaining grooves extends from a center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device and is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 19 and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Also, *Burke* does not teach, show, suggest, or otherwise make obvious a rotatable platen for a polishing system, comprising a patterned pad mounting surface forming a plurality of non-intersecting fluid retaining grooves each having a portion oriented at an angle relative to a radial line originating at a center of the pad, the portion adapted to flow a fluid inwardly from a perimeter portion to a center portion of the platen during rotation of the platen, and wherein at least one of the non-intersecting fluid retaining grooves wherein at least one of the non-intersecting fluid retaining grooves extends from the center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device and is sloped so that a groove depth changes along a length of the at least one

non-intersecting fluid retaining groove, as recited in amended claim 28 and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Also, *Burke* does not teach, show, suggest, or otherwise make obvious an apparatus, comprising an apparatus, comprising a semiconductor polishing device having a first surface defining at least one non-intersecting fluid retaining groove at least a portion of which is oriented at an angle relative to a radial line originating at a center of the semiconductor polishing device, and wherein the non-intersecting fluid retaining groove has a first portion and a second portion having a same direction of curvature and defining a tangent point to the radial line and wherein the non-intersecting fluid retaining groove extends from a center portion of the semiconductor polishing device to an outer portion of the semiconductor polishing device and is adapted to flow a fluid inwardly toward a center portion of the semiconductor polishing device, and wherein the non-intersecting fluid retaining groove is sloped so that a groove depth changes along a length of the non-intersecting fluid retaining groove, as recited in amended claim 32 and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Also, *Burke* does not teach, show, suggest, or otherwise make obvious an apparatus for polishing a substrate, comprising (a) a rotatable platen; (b) a motor coupled to the rotatable platen; (c) a polishing head rotatably mounted in facing relation to the rotatable platen; and (d) a polishing pad disposed on the rotatable platen, wherein a plurality of non-intersecting slurry retaining grooves are formed at an interface between the polishing pad and the rotatable platen and wherein a first portion of the grooves are oriented to flow slurry inwardly from an outer region to an interior region at the interface between the polishing pad and the respective rotatable platens for a given direction of rotation of the platen, and wherein a second portion of the grooves are oriented to flow slurry outwardly from a central region to the interior region at the interface between the polishing pad and the rotatable platen for the given direction of rotation of the platen, and wherein at least one of the non-intersecting fluid retaining grooves extends from a center portion of the semiconductor polishing pad to an outer portion of the semiconductor

polishing pad and is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 37. Withdrawal of the rejection is respectfully requested.

Also, *Burke* does not teach, show, suggest, or otherwise make obvious an apparatus, comprising a semiconductor polishing device having a first surface defining at least two fluid retaining grooves at least a portion of which is oriented at an angle relative to a radial line originating at a center of the semiconductor polishing device, wherein the fluid retaining grooves extend from a center portion of the semiconductor polishing device to an edge of the semiconductor polishing device and are adapted to flow a fluid inwardly toward a center portion of the semiconductor polishing device, and wherein at least one of the fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one fluid retaining groove as recited in amended claim 38 and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

New Claims 43-45

New claims 43-44 are allowable for the same reasons discussed above with regard to independent claim 1. New claim 45 is allowable for the same reasons discussed above with regard to independent claim 15.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed.

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to the Applicant's disclosure than the primary references cited in the office action. Therefore, Applicant believes that a detailed discussion of the secondary references is not necessary for a full and complete response to this Office Action.

If the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Keith Taboada at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

By 

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